TM EXTRACT
REPAIR CHARTS

3–8. Troubleshooting Chart

Note. The communication control under test is referred to as communication control 2.

a. Basic Test (figs. 3–1, 6–3).

Step	Equipment setup	Test procedure	Normal indication
1	Connect communication control under test and test equipment as shown in figure 3–1.	Turn on all test equipment.	None.
2	Set front panel controls of the test facilities kit to the following positions: COMM CONT NO. 1 selector switch: ICS COMM CONT NO. 1 VOL control: maximum clockwise COMM CONT TEST: OFF	Set the test facilities kit dc power switch to ON.	Dc power lamp lights *(red)*.
3	*Microphone Amplifier Test* Set communication control 2 selector switch to ICS position and VOL control maximum clockwise.	While holding the test facilities kit HEADSETS 2 switch in the INTERCOM position, blow or speak into headset 2 microphone.	Blowing or speaking sound is heard in headset 1 earphone and, at a reduced volume, in headset 2 earphone.
4	*Headset Amplifier Test* Set communication control 2 selector switch to ICS position and VOL control maximum clockwise.	While holding the test facilities kit HEADSETS 1 switch in the INTERCOM position, blow or speak into headset 1 microphone.	Blowing or speaking sound is heard in headset 2 earphone.

b. Fault Isolation Guide.

Fault	Base test step 3, microphone amplifier	Basic test step 4, headset amplifier	Probable fault and function being tested	Perform Subtest no.
1	0	0	Protective device and filter	1 (para 3–8 *c.*)
2	0	1	Microphone amplifier	2 (para 3–8 *d.*)
3	1	0	Headset amplifier	3 (para 3–8 *e.*)
4	1	1	All other functions	4 (para 3–8 *f.*)

c. Subtest No. 1, Protective Device and Filter Assembly VR1.

NOTE

Use vtvm as required.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
1	Set front panel controls of the test facilities kit to the following positions: COMM CONT NO. 1 selector switch: ICS COMM CONT NO. 1 VOL control: maximum clockwise COMM CONT TEST: OFF DC POWER switch: OFF	No lamps lighted on test facilities kit.	Perform step 2.	Perform step 2.
2	*Shorted Interphone Line Test*			
	a. Set test facilities kit COMM CONT TEST switch to position 1.	*a.* None.	*a.* None.	*a.* None.
	b. Measure resistance from test facilities kit J20–A to J20–B.	*b.* 14 ohms ±10%	*b.* Set test facilities kit DC POWER switch to ON and perform step 3.	*b.* Replace T2 (para 3–16*b*) Repeat step 2.
3	*Protective Device Test* Measure dc voltage between VR1–7 (positive) and VR1–, (negative, dc ground).	20 volts dc ±1.0v	Perform step 4.	Replace VR1 (para 3–14) and repeat step 3.
4	*a.* Set test facilities kit COMM CONT TEST switch to position 7. Set DC POWER switch to OFF and communication control 2 selector switch to ICS.	*a.* None.	*a.* None.	*a.* None.
	b. Measure continuity between J19–A an test facilities kit and relay K1 terminal 5 in communication control 2.	*b.* Short circuit.	*b.* Perform step 4*c*.	*b.* Repair broken lead. Repeat basic test (para 3–8*a*.)
	c. Measure continuity between J19–A on test facilities kit and relay K1 terminal 7 in communication control 2.	*c.* Short circuit	*c.* Test complete	*c.* Replace relay K1 (para 3–17). Repeat basic test (para 3–8*a*).

d. Subtest No. 2 Microphone Amplifier AR1.

Step	Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
1		Set front panel controls of the text facilities kit to the following positions: COMM CONT NO. 1 selector switch: ICS			

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
	COMM CONT NO. 1 VOL Control: maximum clockwise. COMM CONT TEST: OFF DC POWER switch: OFF			
2	Measure resistance between terminals E5 and E4 on the communication control 2.	Approximately 30 ohms in forward direction (use RX10 scale of the ME-26B/U).	Perform step 2.1.	Replace CR13 (para 3-21); repeat basic test (para 3-8*a*).
2.1	Set the communication control HOT MIKE switch to the OFF position. Check continuity between HOT MIKE switch S2-com and termina. E4 on communication control 2.	Short circuit.	Perform step 3.	Replace HOT MIKE switch (para 3-19*b*); repeat basic test (para 3-8*a*).
3	*a*. Set the test facilities kit COMM CONT TEST switch to position 1. Set the DC POWER switch to the ON position.	*a*. None.	*a*. None.	*a*. None.
	b. Disconnect the H-101A/U from the test facilities kit HEADSETS 2 connector and adjust the audio oscillator for a 1,000 Hz, 0.6 volt rms Hz, 0.6 volt rms output signal.	*b*. None.	*b*. None.	*b*. None.
	c. Set the communication control 2 HOT MIKE switch to the HOT MIKE position.	*c*. None.	*c*. None.	*c*. None.
	d. Measure amplitude of audio output between terminal 7 of K1 and ground on communication control 2. **Caution:** Terminals 1 and 2 of AR1 are at B+ potential. Use a measuring device not having a common ground with the power source. Use a ground isolating transformer when using ac powered test equipment to prevent damage of the C-6533/ARC under test.	*d*. 2.75 volts rms ±0.6.	*d*. Replace relay K1 (para 3-17); repeat step 3.	*d*. Perform step 4.
4	Measure amplitude of signal between AR1-2 and ground.	6 to 9 volts rms.	Replace transformer TS (para 3-16*b*); repeat basic test (para 3-8*a*).	Perform step 5.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
5	Measure amplitude of signal between AR1 and ground. *Note.* Be careful when measuring this voltage level signal to avoid measuring stray fields.	0.001 to 0.004 volt rms.	Perform step 6.	Replace audio input transformer T1 (para 3-16*a*); repeat step 5.
6	Remove the audio signal. On test facilities kit, set DC POWER switch to OFF. Measure resistance of T2 primary between AR1-1 and AR1-2. Set HOT MIKE switch to OFF.	85 ohms ±10.	*a.* Replace microphone amplifier assembly AR1 (para 3-12); repeat basic test (para 3-8*a*). *b.* Test complete.	Replace microphone amplifier output transformer T2 (para 3-16*b*); repeat basic test (para 3-8*a*).

e. Subtest No. 3, Headset Amplifier AR2.

Step	Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
1		Set front panel controls of the test facilities kit to the following positions: COMM CONT NO. 1 selector switch: ICS COMM CONT NO. 1 VOL control: maximum clockwise COMM CONT TEST: position 7 DC POWER switch: ON			
2	*a.*	Set selector switch on communication control 2 to ICS.	*a.* None.	*a.* None.	*a.* None.
	b.	Disconnect the H-101A/U from the test facilities kit HEADSETS 2 connector and adjust audio oscillator for 1,000 Hz, 2175 volts rms. **Caution:** Terminals 1, 2, and 3 of AR2 are at B+ potential. Use a measuring device not having a common ground with the power source. Use a ground isolating transformer when using ac powered test equipment ment to prevent damage of the C-6533/ARC under test.	*b.* None.	*b.* None.	*b.* None.
	c.	Measure amplitude of signal between AR2 terminals 2 and 1 and terminals 2 and 3.	*c.* 13.5 volts rms ± 2 volts.	*c.* Replace headset amplifier output transformer T4 (para 3-16*d*); repeat basic test (para 3-8*a*).	*c.* Perform step 3.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
3	Remove signal. On test facilities kit, set DC POWER switch to OFF. Measure resistance from AR2–1 to AR2–2 and AR2–3 to AR2–2.	33 ohms ±10.	Perform step 4.	Check for shorted capacitor C22 by replacing AR2; replace transformer T4 (para 3–16*d*) as required; repeat basic test (para 3–8*a*).
4	Set DC POWER switch ON. Set audio oscillator to 2.75 volts at 1 kHz. Measure amplitude of signal between AR2–4 and AR2–5 (headset amplifier input transformer secondary).	15 mv rms ±5.	Replace headset amplifier AR2 (para 3–13); repeat basic test (para 3–8*a*).	Perform step 5.
5	Measure amplitude of signal between white and red terminals of transformer T3 (headset amplifier input transformer secondary).	15 mv rms ±5.	Replace input transformer T3 (para 3–16*c*); repeat basic test (para 3–8*a*).	Perform step 6.
6	On test facilities kit, set DC POWER switch to OFF. Remove audio signal.			
	a. Measure continuity between test facilities kit J19–A and communication control 2 TB1–17 (interphone line).	*a.* Short circuit.	*a.* Perform step 6*b*.	*a.* Repair faulty wiring and repeat basic test (para 3–8*a*).
	b. Measure resistance between test facilities kit J19–A and communication control 2 TB1–16.	*b.* 3,500 ±200 ohms.	*b.* Perform step 6*c*.	*b.* Replace R32 (para 3–11).
	c. Measure resistance between test facilities kit J19–A and communication control 2 TB1–18.	*c.* 40 ±10 ohms (VOL control maximum clockwise).	*c.* Perform step 6*d*.	*c.* Replace R36 (para 3–11); repeat basic test (para 3–8*a*).
	d. Measure resistance between T3–WHT (terminal) and TB1–9.	*d.* 50 ±10 ohms.	*d.* Perform step 6*e*.	*d.* Replace R34, R36, or R37 (para 3–11 and 3–19*a*).
	e. Measure continuity between test facilities kit I19–B and communication control 2 TB1–24.	*e.* Short circuit, less than 0.5 ohm.	*e.* Test complete.	*e.* Repair faulty wiring; repeat basic test (para 3–8*a*).

f. Subtest No. 4, All Other Functions.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
1	Set front panel controls of the test facilities kit to the following positions:			

Step	Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
		COMM CONT NO. 1 selector switch: ICS COMM CONT NO. 1 VOL control: maximum clockwise COMM CONT TEST switch: position 2 DC POWER switch: ON			
2	*Transmit Control Test*	While holding test facilities kit HEADSETS 2 switch in TRANSMIT position, rotate communication control 2 selector switch to positions 1, 2, 3, 4 and 5.	Test facilities kit CONTROL SIGNAL lamp is lit in each switch position.	Perform step 3.	Perform step 13 if CONTROL SIGNAL lamp does not light in one position. Perform step 14 if CONTROL SIGNAL fails to light in all positions.
3	*Transmit Audio Test*				
	a.	Disconnect headsets 1 and 2 from test facilities kit; connect a 150-ohm resistor across terminals of test facilities kit J20.	*a.* None.	*a.* None.	*a.* None.
	b.	Connect audio oscillator to J19 and adjust audio oscillator for a 1,000 Hz, 0.6 volt rms output.	*b.* None.	*b.* None.	*b.* None.
	c.	Measure audio output voltage at test facilities kit J20 while holding HEADSETS 2 switch in TRANSMIT position and rotating communication control 2 selector switch to positions 1, 2, 3, 4 and 5.	*c.* 0.4 volt ±0.1 volt rms minimum in each position.	*c.* Perform step 4.	*c.* Perform step 16 if audio signal is low or not present in all positions. Perform step 15 if audio signal is normal in at least one position. If signal is over 0.5 volt rms, adjust the setting of R29, the transmitter audio level adjust control, for 0.4 volt rms.
4	*Selector Switch Receiver Audio Test*				
	a.	Set test facilities kit COMM CONT TEST switch to position 3, receiver monitor switches to OFF, and connect H-101A/U to HEADSETS 2 connector, remove 150-ohm resistor from test facilities kit J20 terminals.	*a.* None.	*a.* None.	*a.* None.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
	b. Adjust audio oscillator for 1,000 Hz 2.75 volts rms.	b. None.	b. None.	b. None.
	c. Rotate communication control 2 selector switch to positions 1, 2, 3, 4 and 5.	c. Audio tone is heard in headset 2 for position selected.	c. Perform step 5.	c. If tone is not heard on any channel, replace communication control selector switch S1 (para 3-19b).
5	*Monitor Switch Receiver Audio Test*			
	a. Set communication control 2 selector switch to ICS. Check that audio oscillator is set as in step 4.	a. None.	a. None.	a. None.
	b. Set communication control 2 receiver monitor switches 1, 2, 3, 4, 5 and AUX to ON position one at a time, returning each to OFF position before setting next switch to ON.	b. Audio tone is heard in headset 2 when switch is ON; no audio is heard when switch is OFF.	b. Perform step 6.	b. Perform step 19.
6	*NAV 1 Monitor Test*			
	a. Set test facilities kit COMM CONT TEST switch to position 6, check that audio input is as in step 4.	a. None.	a. None.	a. None.
	b. Set communication control 2 NAV switch to ON position.	b. Audio tone is heard in set 2.	b. Perform step 7.	b. Perform step 19.
7	*NAV 2 Monitor Test* Set test facilities kit COMM CONT TEST switch to position 5. Check that audio input is as in step 4.	Audio tone is heard in headset 2.	Perform step 8.	Perform step 19.
8	*Direct Input Line 4 Test*			
	a. Set all communication control 2 receiver switches to OFF; switches to OFF; check that audio input is as in step 4.	a. None.	a. None.	a. None.
	b. Set test facilities kit COMM CONT TEST switch to position 4.	b. Audio tone is heard in headset 2.	b. Perform step 9.	b. Perform step 20.
9	*Direct Input Line 3 Test*			
	a. Set all communication control 2 receiver switches to OFF. Check that audio input is as in step 4.	a. None.	a. None.	a. None.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
	b. Set test facilities kit COMM CONT TEST switch to position 8.	b. Audio tone is heard in headset 2 and is a lower level tone than for position 4.	b. Perform step 10.	b. Perform step 20.
10	*Direct Input Line 1 Test*			
	a. Set all communication control 2 receiver switches to OFF. Check that audio input is as in step 4.	a. None.	a. None.	a. None.
	b. Set test facilities kit COMM CONT TEST switch to position 9.	b. Same as step 9.	b. Perform step 11.	b. Perform step 20.
11	*Direct Input Line 2 Test*			
	a. Set all communication control 2 receiver switches to OFF. Check that audio input is as in step 4.	a. None.	a. None.	a. None.
	b. Set test facilities kit COMM CONT TEST switch to position 10.	b. Same as step 9.	b. Perform step 12.	b. Perform step 20.
12	*Hot Mike Test*			
	a. Remove 1 kHz audio signal from J19.			
	b. Set communication control 2 HOT MIKE switch to the on position.			
	c. Blow or talk into headset 2 microphone and listen for this sound in earphone (while wearing headset).	c. Blowing or talking is heard in headset 2 earphones.	c. Test complete.	c. Replace HOT MIKE switch S2 (para 3–19*b*); repeat step 12.
18	Control Line Continuity Test			
	a. Set test facilities DC POWER switch to OFF.	a. None.	a. None.	a. None.
	b. Set communication control 2 selector switch to position in which lamp does not light.	b. None.	b. None.	b. None.
	c. Check continuity for the switch position that failed.	c. Short circuit.	c. Replace switch S1 (para 3–19*b*); repeat basic test (para 3–8*a*).	c. Repair, faulty wiring. Repeat step 2.

Sel sw position	J1 pin	VR1
1	X	1
2	T	1
3	N	1
4	J	1
5	BB	1

Step	Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
14	Measure resistance on communiction control 2 through diode CR9 from VR1-1 to VR1-2.	Measure with TS-352B=U RX10 scale.	Approximately 50 ohms in CR9 forward direction.	Replace switch S1 (para 3-19*b*).	Replace CR9; repeat basic test (para 3-8*a*).
15	Transmit Audio Continuity Test.				
	Measure continuity between the following points:		Short circuit.	Replace switch S1 (para 3-19*b*); repeat basic test (para 3-8*a*).	Repair faulty wiring and repeat basic test (para 3-8*a*).

Sel sw position	J1 pin	R29 terminal
1	V	3
2	R	3
3	L	3
4	F	3
5	P	3

16	Transmit Audio Electrical Test			
	a. Connect cable CX-10893/AR to communication control 2 connector J1. Set test facilities DC POWER switch to ON. Set COMM CONT TEST switch to 2.	*a.* None.	*a.* None.	*a.* None.
	b. Disconnect the H-101A/U from test set facilities kit HEADSETS 2 connector; connect a 150-ohm resistor across terminals of test facilities kit J20, and set audio oscillator to 0.6 volt at 1kHz.	*b.* None.	*b.* None.	*b.* None.
	c. Set communication control 2 selector switch to position 1.	*c.* None.	*c.* None.	*c.* None.
	d. Measure audio output voltage between K1-1 and E2 while depressing HEADSETS 2 switch to TRANSMIT.	*d.* 2.75 volts rms ±0.6 volt.	*d.* Perform step 17.	*d.* Replace relay K1 (para 3-17); repeat basic test (para 3-8*a*).
17	Measure audio output signal between TB1-1 and E1 while depressing HEADSETS 2 switch to TRANSMIT.	1.1 volt rms ±0.5 volt.	Perform step 18.	Replace resistor R28 (para 3-11); repeat step 3.

Step	Settings and instructions	Normal indication	If indication is Normal	If indication is Abnormal
18	Measure audio output signal from R29–3 front to E1 while depressing HEADSETS 2 switch to TRANSMIT.	0.255 volt rms ±0.1 volt.	*a.* Replace S1 (para 3–19*b*). Repeat basic test (para 3–8*a*). *b.* Test complete.	*a.* Replace resistor R29 (para 3–18); repeat step 3. *b.* Test complete.
19	Receiver Monitor Continuity Test.			
	a. Set test facilities DC POWER switch OFF.	*a.* None.	*a.* None.	*a.* None.
	b. Set communication control 2 monitor switch to faulty channel to ON position.	*b.* None.	*b.* None.	*b.* None.
	c. Refer to figure 6–3 and check continuity and measure resistance values of circuits associated with S3 through S9 as follows.	*c.* With S3 thru S8 ON read 16,000 ohms ±3,200; with S9 ON read 12,000 ohms ±2,400 with S3 thru S9 OFF read 8.200 ohms ±1,600.	*c.* Repeat step 5 or 7.	*c.* Repair and repeat step 5 or 7.

Monitor switch No.	TB1	J1 pin
1	18	KK
2	18	SS
3	18	PP
4	18	MM
5	18	EE
AUX	18	UU
NAV	18	VV& WW

20	Direct Input 1, 2, 3, and 4 Continuity Test. Refer to figure 6–3 and check continuity and measure resistance values of circuits associated with the appropriate input line.	Read 16,000 ±3,200 ohms.	Repeat step 8, 9, 10, or 11.	Repair and repeat steps 8, 9, 10, or 11.